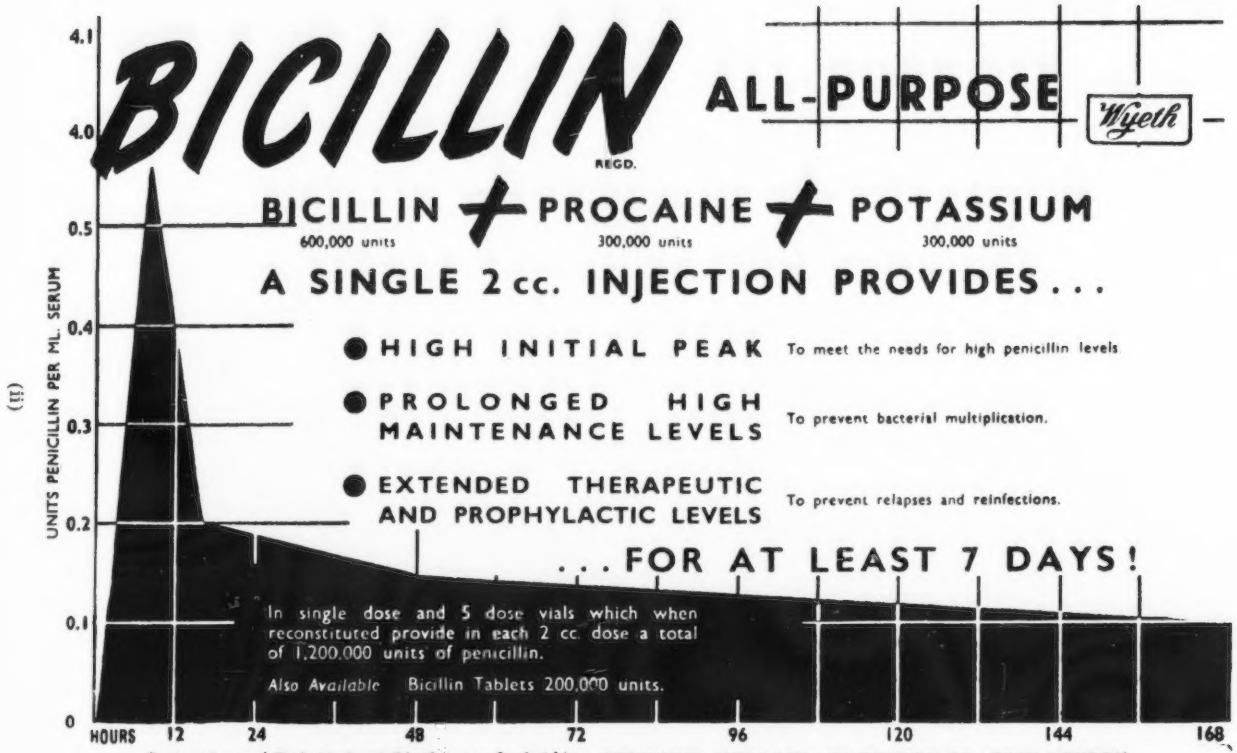
The South African Journal
of
Medical Laboratory Technology

ORGAN OF THE SOCIETY OF MEDICAL LABORATORY TECHNOLOGISTS OF SOUTH AFRICA

Vol. 1, No. 2 A QUARTERLY June, 1955

Single Numbers 5/6 Annual Subscription 11/1/0

Printed by Process Printers, Ltd., Berea Road, Durban, and published by the Society of Medical Laboratory Technologists of South Africa, c/o Central Pathological Laboratory, Private Bag, Jacobs, Natal.



(II)

Registered user of Trade Mark and Distributors in South Africa WYETHICAL (PTY.) LTD., 54 STATION ST., EAST LONDON

DIRECTORS: E. M. MILNE (CHAIRMAN), A. G. BRUSH (U.S.A.), D. A. E. EVANS (ALT.), O. N. FLEMMER, N. R. TUCK (MANAGING)

The South African Journal
of
Medical Laboratory Technology

ORGAN OF THE SOCIETY OF MEDICAL LABORATORY TECHNOLOGISTS OF SOUTH AFRICA

Vol. 1, No. 2 A QUARTERLY June, 1955

CONTENTS

REDAKSIONEEL

MEDIESE TEGNOLOGIE IN DIE KAAP PROVINSIE

Die hoop word gekoester dat met die uitgawe van hierdie Joernaal die skakel tussen Mediese Tegnoloë dwarsdeur Suid Afrika versterk sal word. Alhoewel die Nationale vereniging sedert 1951 bestaan, is dit ongelukkig dat, weens die lang afstande tussen verskillende sentrums, so veel Tegnoloë geen kennis dra van Mediese Tegnologie buite hulle eie provinsies nie. Ons hoop om deur middel van kort verslae van Mediese Tegnologie oor die hele Unie, die toestand te verbeter en begin dus in die uitgawe met 'n artikel oor die Kaap Provinsie.

Die hoofkwartier van Mediese Tegnologie in die Kaap is by die Universiteit van Kaapstad se Mediese Skool. Die Mediese Skool en die Groote Schuur Hospitaal laboratoriums is die sentrale inrigtings vir die laboratoriums ondersoek van monsters wat ingestuur word deur hospitale wat opleidings inrigtings is vir mediese studente. Die tegnoloë werksaam by die Mediese Skool se Patalogiese Afdeling en die Groote Schuur Hospitaal laboratoriums is gesamentlik aangestel deur die Kaapse Provinsiale Administrasie en die Universiteits owerhede. 'n Virus navorsingsinstituut gekontroleer deur die Raad vir Wetenskaplike en Industriele Navorsing is verbonde aan die Mediese Skool. Ander dienste in Kaapstad sluit in 'n tak van die Unie Gesondheids laboratoriums en in 'n Bloedoortappings Diens.

By Oos-Londen is daar 'n Provinsiale laboratoriums-diens verbonde aan die Frere Hospitaal en in Port Elizabeth is daar 'n mediese laboratorium onder die kontrole van die Suid Afrikaanse Instituut vir Mediese Navorsing. Tegnoloë is ook gestasioneer by die hospitale in Kimberley en Worcester.

Die Kaapse tak van die vereniging het 34 lede, van die is 17 studente. Die Takkomitee bestaan uit ag lede, insluitende twee studenteverteenwoordigers. Mnr. G. Turner en Mnr. J. Maytham (albei van die medieseskool) is voorsitter en sekretaris. Studente tegnoloë word opgelei deur die Vereniging in samewerking met die Universiteits owerhede, en lesings word deur universiteits-lektore en mediese skool laboratorium staf gegee.

Tegnoloë in Oos-Londen is lede van die Natal tak van die vereniging weens hulle lang afstand van Kaapstad.

EDITORIAL

MEDICAL TECHNOLOGY IN THE CAPE PROVINCE

It is hoped that the publication of this Journal will strengthen the links between Medical Technologists throughout South Africa. Although the National Society has existed since 1951, it is unfortunate that, due to the great distances between the different centres, many technologists have little idea of Medical Technology in provinces other than their own. We hope to improve this situation by giving a short account of Union-wide Medical Technology, beginning, in this issue, with the Cape Province.

The headquarters of Medical Technology in the Cape are at the University of Capetown's Medical School. The Medical School and the Groote Schuur Hospital laboratories are central depots for the laboratory examinations of specimens. These specimens are from hospitals which are teaching hospitals to medical students. The technologists employed at the Medical School Pathology Department and the Groote Schuur Hospital Laboratory are appointed jointly by the Cape Provincial Administration and the University authorities. A Virus Research Institute, controlled by the Council for Scientific and Industrial Research, is attached to the Medical School. Other services in Capetown include a branch of the Union Health Laboratories, some private laboratories, and a Blood Transfusion Service.

East London has a Provincial Laboratory service attached to the Frere Hospital, and in Port Elizabeth there is a medical laboratory under the South African Institute for Medical Research. Technologists are also stationed at hospitals in Kimberley and Worcester.

The Cape Branch of the Society has 34 members, of which 17 are students. The Branch Committee is composed of eight members, including two student representatives, with Mr. G. Turner and Mr. J. Maytham (both of the Medical School) as Chairman and Secretary. Student technologists are trained by the Society in conjunction with the University authorities, and lectures are given by University lecturers and the Medical School laboratory staff.

Technologists in East London are members of the Natal Branch, because of their distance from the centre of activity at Capetown.

INVESTIGATION INTO POSITIVE EIJKMAN TESTS OBTAINED FROM SAMPLES OF NATAL WATER

M. C. BOTHA and B. H. BATES
(Senior Pathologist) *(Senior Technician)*
Government Pathology Laboratory, Durban

The ability to form acid and gas in MacConkey broth at 44° C. is generally held to be practically specific for faecal *Bact. coli* and considerable value is attached to the test for the rapid identification of this organism (Ministry of Health Publication No. 71, p. 24; Topley and Wilson, p. 664). While the specificity of this test, known under the name of Eijkman who in 1904 recorded the observation that coliform bacilli of animal origin are capable of fermenting glucose at 46°C., has been established for certain countries by Levine *et al.* (1934), Wilson *et. al.* (1935), Harold (1937), Bardsley (1938) and Mackenzie and Hilton-Sergeant (1938), it is known that a varying proportion of positive tests, due to the presence of organisms other than *Bact. coli*, type I, faecal, is obtained in different localities when the procedure is applied in the routine bacteriological examination of water samples (Rachavari and Iyer, Taylor). This has in the past resulted in incorrect reports of the finding of faecal coliforms being made, and such inaccuracy in laboratory control is misleading to those responsible for the maintenance of water supplies conforming to prescribed bacteriological standards.

Recent work by Mackenzie *et al.* (1948), confirmed in South Africa by Roux and Dicker (1954) while the present study was in progress, has provided a simple test (growth with gas production in Brilliant Green broth, and indole production in peptone water at 44°C.) in place of the customary MacConkey broth water-bath test at 44° C. This modification of the original test effectively screens out Irregular VI and Irregular II coliforms, the usual types concerned in false positive reactions, without the necessity for identification by time consuming biochemical (IMVIC) procedures.

The investigation described was carried out with the object of discovering what proportion of positive Eijkman tests in subtropical Natal were in fact due to Irregular VI and Irregular II coliforms. There are two factors which suggest that false positive results may be not uncommon in Natal. Firstly, the high average mean temperature may conceivably condition certain organisms found in water to exist at a higher temperature range than corresponding strains in temperate climates. And, secondly, a considerable proportion of the human population of Natal corresponds to that of India, from where aerogenes-like strains of coliforms, whose natural habitat is not known, have been reported as capable of producing acid and gas in the 44° C. MacConkey test (Rachavari and Iyer).

The period of this survey was from 1st January, 1954, to 30th June, 1954, and the total number of water samples routinely tested in this period was 930. For various reasons the number of samples which were suitable for the further examination entailed in this survey was 885. The samples came from all parts of Natal, and consisted of both treated and raw (wells, boreholes, natural streams) waters received in the ordinary way for routine bacteriological testing.

METHOD

Following in detail the techniques set out in the British Ministry of Health Publication 71 (Revised Edition) (1939), "The Bacteriological Examination of Water Supplies", the following procedure was applied:

All samples of water were routinely tested at 37° C. for 48 hours. Tubes from samples showing acid and gas at 37° C. were subcultured into MacConkey broth at 44° C. in carefully controlled water baths.

Where a positive Eijkman test resulted after 48 hours' incubation, a single positive tube for each original sample from the 44° C. test was plated on to Eosin Methylene Blue agar (E.M.B. agar). After 24 hours at 37° C. the most suspicious colonies were carefully subcultured, first into citrate medium, then into peptone water (using two separate inocula from the same colony); and 4–6 hours later were subcultured from this latter medium into two tubes of glucose phosphate broth. The following tests were done: Methyl Red, Voges-Proskauer, Indole, growth in citrate, and gelatine liquefaction.

Any organism, showing reactions other than those typical for *Bact. coli*, type I, faecal, obtained via a tube showing a positive 44° C. reaction, was checked at once by replating from gelatine on E.M.B. Agar and retesting by IMVIC and ability to reproduce acid and gas at 44° C. A subculture was then kept of the strain, and finally, when the survey was completed, all strains were again plated out on both MacConkey agar and E.M.B. agar. Single colonies on each medium were again tested by IMVIC, and this always included gelatine liquefaction and a 44° C. water bath test.

RESULTS OF TESTS

The results obtained are shown by Tables I, II and III, in which the findings are summarised.

TABLE I

No. of samples tested	Positive Eijkman tests	Total No. of strains	Strains typed by IMVIC and 44° C.		
			Bact. coli, type I, faecal	Irregular VI	Irregular II
885	110	113	97 85.9%	12 10 6%	4 3.5%

The total number of coliform strains producing acid and gas at 44°C. (113) is greater than the total positive Eijkman tests (110) because in several samples two or more different coliforms were isolated. This is made clearer by Table II.

TABLE II

Sample	Initial Eijkman test (44°C.)	Types isolated on E.M.B. plate	Subsequent Eijkman tests (44°C.)
61	+	*Bact. coli*, type I, faecal Irregular VI Irregular II	+ + +
117	+	*Bact. coli*, type I, faecal Irregular II	+ +
337	+	*Bact. coli*, type I, faecal Irregular VI	+ +
350	+	*Bact. coli*, type I, faecal Irregular VI	+ +
435	+	*Bact. coli*, type I, faecal Irregular VI	+ +
468	+	*Bact. coli*, type I, faecal Irregular VI	+ +

OTHER STRAINS ISOLATED FROM E.M.B. PLATES

In addition to the strains producing acid and gas at 44° C., the following strains were isolated from the E.M.B. plates, i.e. were also viable at 44° C., but could not be made to produce acid and gas on reculturing in MacConkey broth at that temperature.

Aerobacter aerogenes	7 strains
Aerobacter cloacae	2 strains
Intermediate, type II	1 strain
Intermediate, type I	1 strain
Bact. coli, type II	1 strain
Irregular (other types)	20 strains

TABLE III

DETAILED ANALYSIS OF THE EIJKMAN TESTS ON THE ORIGINAL WATER SAMPLES

Coliform type	No. of strains	
Bact. coli, type I, faecal	91	82.8%
Irregular VI	7	6.4%
Irregular II	2	1.8%
Bact. coli, type I, faecal, with Irregular VI	4	3.6%
Bact. coli, type I, faecal, with Irregular II	1	0.9%
Bact. coli, type I, faecal, with Irregular VI and Irregular II	1	0.9%
No causative organism found	4	3.6%
Total positive Eijkman tests	110	100.0%

DISCUSSION

From 9 out of the 885 samples tests, non-faecal coliforms producing acid and gas in bile broth at 44° C. were found as the only organism present. This represents 8.2% of the positive Eijkman Tests.

As shown by Table III, 3.6% of the total positive Eijkman tests obtained from the original water samples were found not to have produced on E.M.B. medium or growth of organisms capable of forming acid and gas at 44° C. on reculturing in bile broth. This procedure would not have shown anaerobic organisms such as *Cl. welchii*, known to give false positive Eijkman Tests, which may account for some proportion of this group.

These two groups in combination amount to a substantial proportion (11.8%) of positive Eijkman Tests. Since the bacteriological findings in this group can be regarded as being of doubtful significance in indicating excremental contamination of the water, the use of the Eijkman test as the final method of identification alone in routine bacteriological testing of water in Natal is of little value.

SUMMARY

The final analysis shows that from 82.8% of positive Eijkman tests obtained from routine water samples, *Bact. coli*, type I, faecal, was isolated

and shown to be the only organism growing at 44° C. and prducing acid and gas, while in 8.2% of tests, Irregular VI and Irregular II alone were found. In 5.4% of positive tests, *Bact. coli*, type I, faecal, was found in combination with Irregular VI or Irregular II and, in one instance, with both of these strains.

REFERENCES

BARDSLEY, D. A. (1934). *J. Hyg. Camb.*, **34**, 38.
BARDSLEY, D. A. (1938). *J. Hyg. Camb.*, **38**, 309.
HAROLD, C. H. H. (1936). *31st ann. Rep. met. water Bd. Lond.*
HAROLD, C. H. H. (1937). *32nd ann. Rep. met. water Bd. Lond.*
LEVINE, M., EPSTEIN, S. S. and VAUGHAN, R. H. (1934). *Amer. J. publ. Hlth.* **24**, 505.
MACKENZIE, E. F. W. and HILTON-SERGEANT, F. C. (1938). *J. R. army med. Cps.* **70**, (14), 73.
MACKENZIE, E. F. W., TAYLOR, E. W. and GILBERT, W. E. (1948). *J. gen. Microbiol.*, **2**, 197.
RACHAVARI, T. N. S. and IYER, P. V. S. (1938). *Ind. J. med. Res.*, **28**, 4.
ROUX, P. and DICKER, M. (1954). *S. Afr. med. J.*, **28**, 439.
TAYLOR, C. B. (1945). *J. Hyg. Camb.*, **44**, 109.
TOPLEY, W. W. C. and WILSON, G. S. (1947). *Principles of Bacteriology and Immunity, 3rd ed., Arnold, Lond.*
WILSON, G. S., TWIGG, R. S. *et al* (1935). *Spec. Rep. ser. med. Res. Coun., Lond.* No. 206.

ACKNOWLEDGMENTS

We wish to thank the Secretary of Health for permission to publish these findings, and Dr. I. Prinsloo, Dr. I. Robertson and members of the staff, Union Health Laboratory, Durban, for assistance.

* * *

NOT A BACK-FENCE GOSSIP

(Abstracted from Items of Interest, *Trop. Med. Hyg. News* **1**, 18)

A biochemist, newly acquainted with *Endamoeba histolytica* on which he is now performing physiological investigations, was sitting in a deep study by a microscope when a more sophisticated protozoologist entered his room.

"What's the matter, Harry?"

"Well, I was just watching these amoebae. There was a long one lying stretched out right in the middle of the field and another amoeba slithered up alongside it. Then, pretty soon, a third one came along and squeezed between the other two. It looked like he was jealous."

"And then . . Did you see anything? Did anything more happen?"

"I don't know. I got so darned embarrassed I turned out the light."

* * *

EXAMINATION SUCCESSES

The following candidates were successful in the Intermediate Examinations held in Durban in January, 1955:

Andersen, U. E.
Coetzee, E. F. C. (with distinction).
Matee, H. T.
Schmidt, S. (East London).
van der Westhuyzen, J. F. (East London).
Archibald, B.
Foster, V. B.
Mdlekeza, E.
Sibisi, E. S.
Zondi, L. D. (with distinction).

OBSERVATIONS ON THE IMMOBILISATION OF *E. HISTOLYTICA* BY ANTISERUM FROM CASES OF AMOEBIC DYSENTERY AND HEPATIC ABSCESSES

M. I. VAN DER LINGEN

C.S.I.R. Amoebiasis Research Unit, King Edward VIII Hospital, Durban

Cole and Kent (1953) have demonstrated that the sera of rabbits inoculated with cultures of *E. histolytica* immobilise the trophozoites of this species in vitro. Amoeba-trypanosome cultures were used. Normal rabbit serum was used for the controls. The percentage of trophozoites immobilised by the immune serum varied directly with the concentration of the serum. It was found that the amoebae recovered after about one hour. Maximal immobility was found at 20 – 30 minutes. Preliminary experiments showed that the capacity to immobilise amoebae also occurred in serum from cases of fulminating amoebic dysentery and from cases of amoebic liver abscess.

As a first step, it was necessary to investigate the variation of the number of amoebae immobilised with time. This would give a basis for future observations by showing at what time after the commencement of incubation with antiserum the amoebae showed maximal immobilisation.

MATERIALS AND METHODS

Cultures of *E. histolytica* with a mixed bacterial flora were maintained on Locke-Egg medium as used routinely in this laboratory. At first, amoebae from 24 – 36 hour cultures were used, but it was found more satisfactory to use those from 20 – 24 hour cultures since the mobility seemed to decrease with age of culture. Material from several tubes was pooled in a Wasserman tube which was corked and incubated at 37° C. The depth in the tube was ½ inch. During the first three-quarters of an hour of incubation, the tube was rolled between the palms of the hands at intervals. The amoebae were incubated for three hours. This appears to enhance mobility as experiments in which the amoebae were taken from the culture tubes and immediately treated with serum were unsatisfactory due to the extreme variability and the large number of inactive amoebae in the controls.

After a three-hour incubation period, 0.05 ml. of amoebic suspension was mixed on a slide with an equal volume of the serum to be tested. A 22 x 22 mm. coverslip rimmed with vaseline was used to seal the preparation. Sealing to maintain anaerobiosis is most important as rounding-up of amoebae results if air bubbles are present. Observations were carried out at intervals from 5 minutes to 4 hours on an electric warming stage at 37° C.

It was found that examination under low power alone frequently failed to reveal mildly active amoebae. As a result, in doubtful cases the high power lens was used. In many cases, amoebae display cytoplasmic cyclical motion or send out pseudopodia without actually moving across

the field. It must be decided beforehand what will constitute mobility and a definite standard laid down and adhered to.

The number of motile amoebae in the first 25 observed was recorded in each case.

Normal sera from persons free from protozoan infestation were used as controls. The serum was separated off aseptically and stored in the deep-freeze at −20° C.

RESULTS

In all cases, plots of the numbers of non-motile amoebae against time show the same type of curve. The higher the number of non-motile forms the greater is the degree of immobilisation. This is initially very variable but rises to a maximum between 40 and 80 minutes. Thereafter the amoebae gradually recover and the degree of immobilisation drops. It was found, in contrast to the work of Cole and Kent, that sera showed a high reactive capacity. Normal sera showed immobilising properties but were sharply different in degree from the dysenteric and liver abscess cases in the critical 40–80 min. period. There was little difference between the reactivity of sera from dysenteric and hepatic abscess cases; both these showed a high reactivity during the critical period. The controls were normal sera in a concentration of 1 : 1 Dysenteric serum in a dilution of 1 : 2 (i.e. equal parts of culture medium and 50% serum) showed an activity less than the higher concentration but higher than the controls. Two different control sera gave very similar results.

Further investigations to determine the degree of immobilisation by the method of Cole and Kent were carried out as follows. Amoebic suspension was mixed with dilutions of serum 50% (1 : 2), 25% (1 : 4), and 12.5% (1 : 8), and covered with a rimmed coverslip. The slides were then incubated for 45 minutes. Extremely variable results, however, were obtained. Cole and Kent give their method for obtaining specific immobilisation percentages; using this method and averaging the controls the following figures emerge:

Dysenteric case 1 : 1 — 93% immobilisation
Hepatic abscess case — 93% immobilisation
Dysenteric case 1 : 2 — 66% immobilisation

Observations of amoebae under dark-ground illumination show no difference between treated and untreated amoebae. It appears that the same results are obtained if the serum is held at 56° C. for 30 mins. and if it is used without this treatment.

DISCUSSION

The complement apparently plays no part in the reaction which appears to be an antigen-antibody reaction. Further studies using different species of amoebae are indicated.

It is suggested that instead of using 1 : 1 normal serum as a control for all dilutions of antiserum, corresponding dilutions of normal serum are used. Thus the control for 1 : 2 antiserum would be 1 : 2 normal serum. It would appear that normal serum itself has some immobilising properties.

Further experiments should proceed along the lines indicated using different strains of amoebae as all strains may not show the same susceptibility. It would seem that the titration could not ever rest on a firm quantitative basis, but as a qualitative and semi-quantitative means of investigation the method has great possibilities. It would seem important to establish the extent of cross-reactions.

Taken in conjunction with Goldman's work (1952) on fluorescein-tagged antibody this technique opens up new avenues of approach to the whole problem of antibody formation in cases of protozoal infection.

REFERENCES

COLE, B. A. and KENT, J. F. (1953). *Proc. Soc. exp. Biol. Med.*, **83**, 811.
GOLDMAN, M. (1952). *Amer. J. Hyg.*, **58**, 319.

* * *

A SIMPLIFIED FERMENTATION METHOD

J. GREENSTEIN
Central Pathological Laboratory, Wentworth Hospital, Durban

Lactose occurs in the urine during pregnancy and lactation. Lactosuria is of fairly common occurrence in nursing mothers and it is of the greatest importance that lactosuria should be clearly and definitely distinguished from glycosuria. The former does not require treatment but the latter is in most cases associated with *Diabetes mellitus*, though in pregnancy glycosuria can also occur as a result of the lowering of the renal threshold.

The technologist is required to differentiate between Lactose and Glucose in the urine specimen and this is done by performing a fermenation test. Both sugars give positive Benedict's reactions and this test therefore can be used only to detect and to give a rough quantitative estimation of sugars present in the specimen of urine. The fermentation test depends upon the difference in behaviour of the two sugars in contact with yeast. Glucose is fermentable, whilst Lactose is non-fermentable.

The performance of the fermentation test as usually carried out requires the use of U tubes or eudiometers and the test and controls calls for the use of four such pieces of apparatus. Large test tubes and Durham tubes may be used, but whichever apparatus is used they give rise to some difficulty in filling and sterilising.

The apparatus required for the test is rarely available in small laboratories and certainly not in a side-room laboratory.

The simple method which is to be described requires no more equipment than a few test tubes and one or two small erlenmeyer flasks, or large test-tubes. Test the specimen with litmus paper and if alkaline make it slightly acid, using $^{N}/_{10}$ Hydrochloric acid. The specimen of urine is divided into two portions and the specimen is tested for the presence of sugar using the routine Benedict's method. If the test is positive, boil both portions of the specimen in small erlenmeyer flasks or large test-tubes (6″ x 1″) for a few minutes to destroy yeasts and bacteria.

Plug the containers with cotton wool and allow them to cool to room temperature. Keep one portion in a refrigerator in the event of the specimen being required for further investigation. Set up a control by adding a small pinch of glucose to 25 ml. of water in an erlenmeyer flask. 25 ml. of boiled urine is ample for the test. To both the control and the boiled urine add a small piece of bakers yeast and place the flasks in an incubator, or stand in a warm place for 12 hours—overnight being a convenient period.

During this time any glucose present originally will have been fermented, but lactose, if present, will still be present as this sugar is not fermentable by yeast. The presence or absence of sugar is determined by again performing the Benedict's test. If sugar is absent, then the sugar has been destroyed by fermentation and must therefore have been glucose. If the Benedict's test is still positive after the fermentation period the sugar present is lactose. The control is to test the activity of the yeast. The control should give a negative Benedict's test after the fermentation period.

If further confirmation is required, the osazone test can be carried out on the original and fermented portions, but this should rarely be necessary. This simplified method differs from the other fermentation tests in that there is no observation of gas formation but provides chemical proof of the presence or absence of sugar following fermentation by yeast.

As previously mentioned, no special apparatus is required and the use of Benedict's reagent allows for a rough quantitative determination of the lactose, if present. Only one control is required and the flask and urine are sterilised at the same time by boiling the urine in the flask.

REFERENCES

Chemical Methods in Clinical Medicine. HARRISON. 3rd Ed. 121. Churchill, London.
Synopsis of Clinical Laboratory Methods. BRAY. 3rd Ed. 48.
Practical Bact. Haem. & Parasit. STITT, CLOUGH, BRANHAM. 10th Ed. 832. Blakiston, Phil., U.S.A.

* * *

TECHNICAL AIDS IN THE DIAGNOSIS OF CARDIAC DISEASES

(Synopsis of a lecture given by Dr. H. Gordon, of Addington Hospital, to the Natal Branch of the Society on 13th January, 1955)

Dr. Gordon opened his talk by saying that the diagnosis of most heart diseases should be possible without the use of technical aids, but added that these aids were essential for the confirmation of diagnosis and to provide material proof of the patient's condition.

Dr. Gordon went on to outline the history of some of these aids.

A certain Rev. Stephen Hales of Buckinghamshire, in 1773, first applied mechanical aids to observe the blood-pressure of a horse. By incising an artery in the neck of the horse and inserting a tube he noted that the blood rose up into the tube, the height depending on the pressure of the blood. It was an Italian physician, Riva-Rocci, who introduced

an easier method of measuring blood-pressure by introducing the apparatus known as the sphygmomanometer.

A type of stethoscope was first introduced in the early 19th century by Laennec and consisted of a long tube which amplified the sounds of the heart and was carried in the hats of physicians. The stethoscope was gradually improved and the modern bin-aural stethoscope was developed. This is still one of the greatest aids in the diagnosis of heart conditions.

Dr. Gordon went on to explain the uses and to demonstrate some of the more modern technical aids.

First the phonocardiograph, which records the sounds of the heart and is most helpful when the sounds are difficult to time by other means. X-ray pictures help to determine the shape of the heart, and by X-ray screening one can observe the activity of the organ. In angio-cardiography a radio-opaque substance is injected into the blood so that the detailed structure of the heart is shown up on X-ray. This technique was evolved by South American radiologists.

A German physician, Werner Foorssman, first introduced heart catheterization, primarily as a method of local treatment by drugs of heart diseases. From this emerged cardiocatheterization as we know it to-day for measuring the blood-pressure in the different chambers of the heart and determining the oxygen content of the blood. A recent advance in the apparatus for this determination is the oximeter, which simplifies the whole procedure and dispenses with the more complicated van Slyke and Haldane methods.

In 1902, James McKenzie first showed the diagnostic value of arterial and venous pulse wave tracings. His simple apparatus has been considerably elaborated and electronic phlebographs and arteriographs are now often used.

Perhaps one of the most important technical aids in the diagnosis of cardiac disorders is the electro-cardiograph. This machine was devised by Einthoven of Leyden. From this the more compact and simplified electro-cardiographs were developed and to-day there are portable machines weighing only thirty pounds as compared with Einthoven's, which filled a large room surrounded by concrete walls. Television electro-cardiographs are also in use to-day, and Dr. Gordon mentioned a doctor in America whose surgery is equipped with several of these machines and who, by the press of a button, can study the electro-cardiographs of many of his patients without having moved from his surgery chair, and without his patients having left their homes.

Dr. Gordon mentioned the help of laboratory tests, sedimentation rates, blood cultures, electrolyte studies, etc., in the diagnosis of cardiac diseases. The ballistograph was demonstrated, which records the movement of the body in response to the heart-beat.

The speaker concluded his talk by mentioning the shortage of technicians in this field of medicine and hoped that more people would be enlisted into this interesting and varied subject in the future.

J. R. H.

SOME REMARKS ON THE VALUE OF CHEMOTHERAPY WITH "BICILLIN" IN EXPERIMENTAL STUDIES ON WOUND HEALING AND SKIN GRAFTING

(Synopsis of a lecture given by Professor T. Gillman of Natal University to the Natal Branch of the Society on 10th February, 1955)

Professor Gillman opened by saying that his talk had been instigated by Mr. Sadler of Wyethical, Ltd., who had been extremely helpful in supplying the antibiotic "Bicillin" with which he had carried out a number of investigations, the results of which had been most valuable. This work is being conducted in the Brenthurst-Schlesinger Research Unit in the Department of Physiology and in collaboration with Dr. Jack Penn, Dr. Doris Brooks and Sister Marie Roux (of Johannesburg), and with the technical assistance of Miss Pat Low, Miss P. Bilborough and Mrs. A. Hart.

Our lecturer went on to explain the healing and treatment of wounds, pointing out that it is the depth of the wound and not the extent which governs the formation of scar tissue. Incised wounds heal quite easily with only a small amount of scar tissue; abrasions and superficial burns heal without any scar formation.

It is the more serious, deeper type of wound, however, such as third degree burns involving loss of most of the epidermis as well as the dermis, which present the problem, for with this type of wound, which is deep as well as extensive, contracture and gross formation of scar tissue normally result. If such a skin wound overlies a joint, so that a limb is involved, contracture can completely incapacitate it. The most successful method of treatment is plastic surgery which obviates scar tissue formation, and therefore contracture, by skin grafts, because where there is little or no scar tissue contracture does not result. What substance or substances in skin grafts inhibit formation of scar tissue?

Professor Gillman went on to give details of grafting experiments on rabbits. He found that by using epidermal grafts only, contracture occurred, but when using dermal grafts no contracture resulted. This leads one to think that the cause of this inhibition is a substance present in the dermis. Professor Gillman said he hoped to be able to isolate this substance and with it carry out further experiments.

Infection and contamination was a problem with Professor Gillman's early experiments with skin grafts. "Bicillin" proved to be an ideal antibiotic and lowered the incidence of sepsis in the animals on which the experiments were being performed and so allowed healing to progress unhindered and uncomplicated. Only 7% of the animals treated with "Bicillin" became infected and Professor named three possible causes. These were:—firstly, a resistant organism; secondly, the lowering of the resistance of the animal due to trauma; and thirdly, the administration of too small a dose of the antibiotic.

Our lecturer ended his talk, which was supported by a number of interesting lantern slides, by answering numerous questions put to him by members.

"Bicillin" is a product of Wyethical (Pty.) Ltd., East London.

J. R. H.

* * *

TECHNICAL ABSTRACTS

A routine method for testing the sulphonamide sensitivity of organisms causing urinary infections.

JEWELL, P. and PEARMAN, G. E. G. (1954). *J. clin. Path.* **7**, 308.

The authors describe a simple plate method for testing the sensitivity of organisms to sulphathiazole, sulphadiazine, sulphamerazine and sulphamezathine.

The method depends upon nutrient media containing minimal traces of sulphonamide antagonizer and the methods of pre-testing peptones and of determining the minimal quantities of lysed blood to effect neutralization of the antagonizer are described. G.W.W.

Paper discs containing entire culture medium for the differentiation of bacteria.

SNYDER-MARSHALL, L. (1954). *J. Path. Bact.*, **67**, 217

A method for the differentiation of bacteria using discs similar to those used for antibiotic sensitivity tests is described. The discs are impregnated with 10 x strengths of the various media and dried. Pour plates of plain agar are used and the discs are placed on the surface. Carbohydrate, urea, VP, MR and Indole are amongst the media mentioned. On test this method gave satisfactory results with the Sugar media but difficulties were encountered with the remainder, probably due to the fact that the correct thickness of absorbent paper was not available. G.W.W.

Staining of cysts.

EATCH, R. D. P. (1954). *Trans. Roy. Soc. trop. Med. Hyg.*, **48**, 103.

"Iodine preparations of faecal specimens are frequently difficult to examine carefully in detail because of flocculation of the faecal material concealing cysts which might otherwise have been visible.

"If the iodine iodide solution is made up using a 1/1,000 solution of Teepol instead of water, surface tension effects are abolished and every particle is discretely visible.

"There is no adverse effect on staining, and in addition the specimen seems to be rather more quickly prepared." S.E.D.

Idenification of Amoebic species by means of fluorescent antibody-antigen reactions.

COONS, A. and KAPLAN, M. (1950). *J. exp. Med.*, **91**, 1–13.

GOLDMAN, M. (1953). *Amer. J. Hyg.*, **58**, 319–328.

GOLDMAN, M. (1954). *Amer. J. Hyg.*, **59**, 318–325.

A novel and rather elegant method for demonstrating *E. histolytica* and *E. coli* is at present being developed by Morris Goldman in the United States. Antibody is labelled with fluorescein and used as a stain to react with the homologous antigenic material in the cell. So far anti-*E. histolytica* and anti-*E. coli* sera have been used with some success. The antibody is made by inoculating rabbits with the organism and bleeding to obtain the anti-serum; the globulin fraction is then separated and conjugated with fluorescein. Non-specific staining is obviated by absorbing the responsible fraction on powdered liver.

Experiments showed that Methanol-fixed *E. histolytica* when exposed to the conjugate became fluorescent and that this is a specific immunological reaction. However, a certain amount of cross reaction between *E. histolytica* and *E. coli* was apparent. This was avoided if anti-*E. coli* conjugate specifically and vice versa for *E. histolytica*. It is interesting to note that was absorbed by large numbers of *E. histolytica* whereupon it stained *E. coli* the small race of *E. histolytica* does not show a high level of staining with anti-*E. histolytica* serum.

I.V.D.L.

Family antigens on "Private" blood groups and the sub-group of A, A4.

DUNSFORD, I. (1953). *Nature* **172,** 1059.

Investigations into the incompatibility of a Group 0 male with others of Group 0 revealed a sub-group of A – A4, only detectable by the use of Group 0 serum. This factor was present in other members of his family.

P.P.M.

Assessment of clotting efficiency.

BIGGS, R. (1955). *Brit. med. Bull.*, **11,** (1).

The difficulties associated with work on blood coagulation can be traced to a lack of definition in the techniques used. It is seldom possible to know what precisely is measured by a particular technique or how reliable an estimation it gives. Coagulation is the only observable result of a long chain of preliminary reactions initiated by contact with a foreign surface, leading in series to thromboplastin formation, the conversion of prothrombin to thrombin, and finally to clotting. These reactions may be summarised as:—

Prothrombin + Thromboplastin + $CaCl_2$ Thrombin
Thrombin + Fibrinogen Fibrin.

Since the clotting time of fibrinogen is inversely proportional to the concentration of thrombin, the clotting time of a solution containing prothrombin, fibrinogen, thromboplastin and calcium may give a measure of its prothrombin content.

However, the speed of prothrombin conversion is affected by two factors called Factor V and Factor VII, so deficiencies in prothrombin, Factor V or Factor VII will lead to coagulation defects.

Another important point in the efficiency of clotting is the formation of Thromboplastin. The factors thought to be necessary for blood thromboplastin formation are:—a) Antihaemophilic globulin and Factor V (present in $Al(OH)_3$–treated normal plasma); b) Christmas-factor and Factor VII (present in normal serum); c) Platelets; and d) Calcium.

In a coagulation defect, the thromboplastin-generation test should be done. The reagents are prepared from the patient's and from normal blood. When they are mixed with $CaCl_2$ and incubated at 37°C. a very powerful thromboplastin forms in the mixture of normal blood factors. Of the deficiencies in the early stages of thromboplastin formation, the most important is haemophilia or "Anti-Haemophilic Globulin" deficiency (Haemophilia A). The thromboplastin generation test records negligible amounts of A.H.G. in the majority of haemophilic patients. The same general principles apply in Christmas disease (Haemophilia B), which is caused by "Christmas-factor" deficiency.

Recently, a new clotting factor, Plasmathromboplastin Antecedent (P.T.A.), has been described (Rosenthal *et al.*, 1955). Clinically, P.T.A. deficiency (Haemophilia C) presents a relatively mild haemophilia-like disease.

REFERENCE

ROSENTHAL, R. L., DRESKIN, O. H. and ROSENTHAL, N. (1955). *J. Haematol.*, **10**, 120.

A.H.S.

* * *

READERS' FORUM

Richardson Pregnancy Test.

I should be glad to know if any readers have had any success with the Richardson (chemical) test for pregnancy. I have tried to get this test to work with two British brands of 2–4 dinitrophenylhydrazine and have drawn blank. If some readers have had better luck, I should like to hear more about it.

H. FLEETWOOD-HOWARD
(Frere Hospital, East London)

* * *

NATIONAL

SOCIETY NEWS

As we go to press the news reaches us of the formation of a new branch of the Society in Johannesburg. It is anticipated that this will be called the Southern Transvaal Branch. A list of officers, etc., will be published in due course.

From Southern Rhodesia advice has reached us of the formation of the Salisbury and District Association of Medical Laboratory Technologists. The Chairman is Mr. Vance Carlisle, F.I.M.L.T., and the Hon. Secretary/Treasurer Mr. N. R. Gregory. The aims of the Association are very similar to our own and we look forward to a period of closer liaison between technologists in Southern Africa. Interested Medical Technologists and allied workers should contact Mr. Gregory at P.O. Box 8079, Causeway, Salisbury, S. Rhodesia.

G. W. WIKELEY,
Hon. General Secretary.

BRANCH NEWS (NATAL)

The main item of interest for the past quarter was the Annual General Meeting of the Branch. Approximately sixty members attended and Branch affairs were given a thorough discussion. Of chief note was the election of new committees, and for the convenience of members a list of the Office-bearers is given.

BRANCH COMMITTEE:

Chairman: Mr. C. J. Scholtz.
Vice-Chairman: Mr. A. Scott.
Hon. Secretary/Treasurer: Mr. J. Pender-Smith.
Committee Members: Messrs. P. N. Buck, G. C. Buckle, and J. R. Hart.
Student Representative: Mr. E. F. C. Coetzee.

EDUCATION COMMITTEE:

Chairman: Mr. A. Scott.
Vice-Chairman: Mr. J. Hart.
Hon. Secretary: Mr. J. Pender-Smith.
Members: Messrs. B. H. Bates, P. N. Buck, and G. C. Buckle.

AUDITORS:

Messrs. G. C. Buckle and J. T. F. Neary.

NATIONAL COUNCIL REPRESENTATIVES:

Messrs. C. J. Scholtz, A. Scott and J. Pender-Smith.

I should like to remind members that subscriptions are now due. These should be sent to the undersigned as soon as possible.

J. PENDER-SMITH.
Hon. Secretary/Treasurer.

STUDENTS' SUB-SECTION:

The following have been elected to represent their respective Laboratories on the Students' Committee:

A. Greenfield (Wentworth)
M. Sutherland (Currie Road)
V. Higgs (Addington)
P. Pirie (K.G.V.)
S. Smit (D.B.T.S.)

The following are the functions for the next three months:

May 19th: All day Picnic.
June 23rd: Tour of Dunlop's Factory.
July 24th (Sunday): All day Tennis Tournament.

E. F. C. COETZEE.
Student Representative.

* * *

DOMESTIC INTELLIGENCE

ENGAGEMENTS:

Miss C. Hodge, of Union Health Laboratories, to Mr. L. Fisher, on 26th February.

Miss J. Stenhouse, of Union Health Laboratories, to Mr. T. Chalmers on 9th April.

MARRIAGE:

Miss P. Oosthuizen, of King Edward VIII Laboratory, to Dr. J. Beneke on 9th April.

EAST LONDON

One touch of nature makes the whole world kin, but one touch of winter fills the average Easter Londoner with alarm and despondency. Though it is reported that progress is being made with the new power station, it is abundantly obvious that it will not be in use this winter, and the existing power station cannot carry the peak loads during the winter months. Last winter we suffered. This winter may well be worse. Power cuts present a special problem for laboratory staff. Though most hospitals have auxiliary plants to provide current for operating theatres and minor X-ray work, the pathology labs are usually without this amenity. Power cuts in previous years have demonstrated our complete dependence on electricity. The work of the laboratory comes practically to a standstill.

We have, it is true, a small hydraulic centrifuge, but one two-bucket centrifuge is not much use in a busy department. These hydraulic centrifuges are very efficient. The Government Laboratory in Durban used to have a couple many years ago, and, provided adequate water pressure was available, they attained a good speed and never developed mechanical faults. Present-day laboratories would do well to have one of these instruments with a large carrying capacity. All our thermostatically-controlled equipment, of course, is out of commission during a power cut, but after some experience of paraffin-operated incubators during the war, I hesitate to recommend the installation of these abominations.

Microscopy is also a major problem. It is practically impossible to use a modern binocular microscope with daylight, and whilst we have, on occasion, used microscopes with built-in 6-volt illuminators off the photo-colorimeter accumulators, their use, while battery-charging facilities are curtailed, is strictly limited.

The arrival of our new Van Slyke apparatus suggests yet another problem. This intriguing machine, which resembles Salvador Dali's idea of a juke-box, has, in place of the conventional mechanical shaker, a magnetically-operated stirring bar. If our power should fail us we could doubtless do without the cunningly-concealed lighting and other advantages of this particular instrument, but the thought of having the laboratory staff in relays agitating magnets over it is causing much nervous apprehension.

H. FLEETWOOD-HOWARD.

* * *

JOHANNESBURG

We should like to extend our most sincere congratulations on the very fine first issue of the Journal. We trust that the Medical Technologists in Johannesburg will be able to help in the future volumes.

A faint glimmering of interest in the affairs of the Society is becoming apparent among the members of the Staff of the South African Institute for Medical Research, probably due to the fact that the Medical Auxiliaries Bill is again before Parliament, and workers are beginning to realise that, if the Bill is passed, the practise of Medical Technology will be restricted to Registered Technologists.

F. A. BRANDT.

RANDOM MEANDERINGS

SHAGGY STATISTICS

BELIEVE IT OR NOT:—

If all the tapeworms affecting man were laid end to end in a straight line, they would reach half-way from here to the moon.

If each person with hookworm loses 1 ml. of blood a day, the world's hookworms are spilling 500 tons of blood a day.

If the *Ascaris* eggs deposited annually in the soil in Natal were distributed evenly, they would work out at 10 eggs in every square foot of that province.

(These estimations were taken from "Why Parasitology?", by Dr. R. Elsdon-Dew, published in the *South African Medical Journal* of 23 October, 1954.)

* * *

CONSTERNATION IN THE WARDS

The following item was copied from a ward notice board in a local hospital:

"A bottle of green fluid in a bottle marked 'Aquamarine' hand lotion is missing from the duty room.

"Will anyone finding same, please return stat, as it contains drug used in treatment of scabies.

"This drug, when used on healthy hands, removes first the epidermis, then dermis, then hands, then forearm, then upperarm, etc." T.B.G.

* * *

SUBSCRIPTION FORM

S.A. JOURNAL OF MEDICAL LABORATORY TECHNOLOGY,
c/o CENTRAL PATHOLOGICAL LABORATORY,
PRIVATE BAG,
JACOBS,
NATAL, SOUTH AFRICA.

I wish to receive THE S.A. JOURNAL OF MEDICAL LABORATORY TECHNOLOGY and enclose £1/1/0 cheque/postal order as annual subscription for 1955.

TEAR HERE

NAME .....

ADDRESS .....

.....

Cheques and Postal Orders should be crossed and made payable to:—

S.A. JOURNAL OF MEDICAL LABORATORY TECHNOLOGY.

Signature of Subscriber.....

NOTICE TO CONTRIBUTORS

All contributions are to be addressed to:—The Editor, "The South African Journal of Medical Laboratory Technology", Laboratory, King Edward VIII Hospital, Durban, Natal.

Contributions may be written in English or Afrikaans, and should preferably be typed in double-spacing on foolscap sheets on one side of the paper only.

Figures should be drawn in Indian ink, and all figures and tables should be labelled as such (e.g. Figure 1, Table 1, etc.).

Authors should make adequate references to previous works on their subjects. These should be set out as follows:—Author's surname and initials of Christian names; the year of publication (in parentheses); the name of the journal, which should be abbreviated according to the World List of Scientific Periodicals (see below); the volume number (underlined); and the first page reference.

Example:—Moron, I. B. (1960). J. unsuccess. Med., 20, 99. References to books should give the author's name and initials, the year of publication, title of book, name of publisher, and town in which published.

References should be arranged in alphabetical order of the authors' surnames. If more than one work by the same author is listed, these should appear in chronological order.

Technologists are reminded that regulations demand that all original articles of a technical or scientific nature must be approved by the heads of their departments before being submitted for publication.

Title abbreviations according to the World List of Scientific Periodicals

All nouns are given capital letters, and adjectives small letters. Articles, conjunctions and prepositions are omitted.

Examples:—

J. Amer. med. Ass.	*S. Afr. J. clin. Sci.*
Lancet	*Stain Tech.*
Amer. J. clin. Path.	*J. Bact.*

KENNISGEWING AAN INSENDERS

Alle bydrae moet as volg geadresseer word:—Die Editeur, „Die Suid Afrikaanse Joernaal van Mediese Technologie", Laboratorium, King Edward VIII Hospitaal, Durban, Natal.

Bydrae mag in Engels of Afrikaans geskryf word en moet verkieslik getik wees dubbel spasiering op folio-papier en net op een kant van die vel.

Figure moet in Indiese ink geteken word en alle figure en tabelle moet geëtikeer word as sulks (b.v. Figuur 1, Tabel 1, ens.).

Auteurs moet voldoende referensies gee tot vorige werke oor hulle onderwerpe. Die moet as volg uiteengesit word:—Auteur se familienaam en voorletters; die jaar van uitgawe (in hakies); die naam van die Joernaal, wat moet verkort word volgens die Wêreld Lys van Wetenskaplike Tydskrifte (sien hieronder); die volume nommer (onderstreep); en die eerste pagina referensie.

Voorbeeld:—Moron, I. B. (1960). J. unsuccess. Med., 20, 99. Referensies tot boeke moet die auteur se naam en voorletters meld, die jaar van uitgawe, titel van boek, naam van uitgewer, en stad waar dit gepubliseer is.

Referensies moet in alfabetiese orde, volgens auteurs se familiename gerangskik word. Indien meer dan een werk deur dieselfde auteur gemeld word, moet dit in tydsorde voorkom.

Tegnoloë word daaraan herinner dat regulasies vereis dat alle oorspronklike artikels van tegniese of wetenskaplike aard moet die goedkeuring dra van hulle departementale hoofde voor dit ingestuur word vir publikasie.

Titel verkortings volgens Wêreld Lys van Wetenskaplike Tydskrifte

Alle selfstandige naamwoorde moet begin met hoofletters en byvoeglike naamwoorde met klein letters. Artikels, verbindings en voorsetsels word uitgelaat.

Voorbeelde:—

J. Amer. med. Ass.	*S. Afr. J. clin. Sci.*
Lancet	*Stain Tech.*
Amer. J. clin. Path.	*J. Bact.*